NSRP RA Project 2019-483-011

Automated Detail Planning and Integrated Shipyard Operation with Engineering Data

ATI Project Manager: Nick Laney
Program Technical Representative: Dan Sfiligoi (NASSCO)

All Panel Meeting Feb 25, 2025

Project Team

Lead:

ShipConstructor Software USA

Patrick Roberts, VP of Sales & Operations

Rob Parker, Professional Services Manager

Darren Guillory, Technical Solutions Specialist

HII Ingalls Shipbuilding

Tim Warren, Manager

Fincantieri Marinette Marine

Rodney Klann, Methods Engineer

GD Bath Iron Works

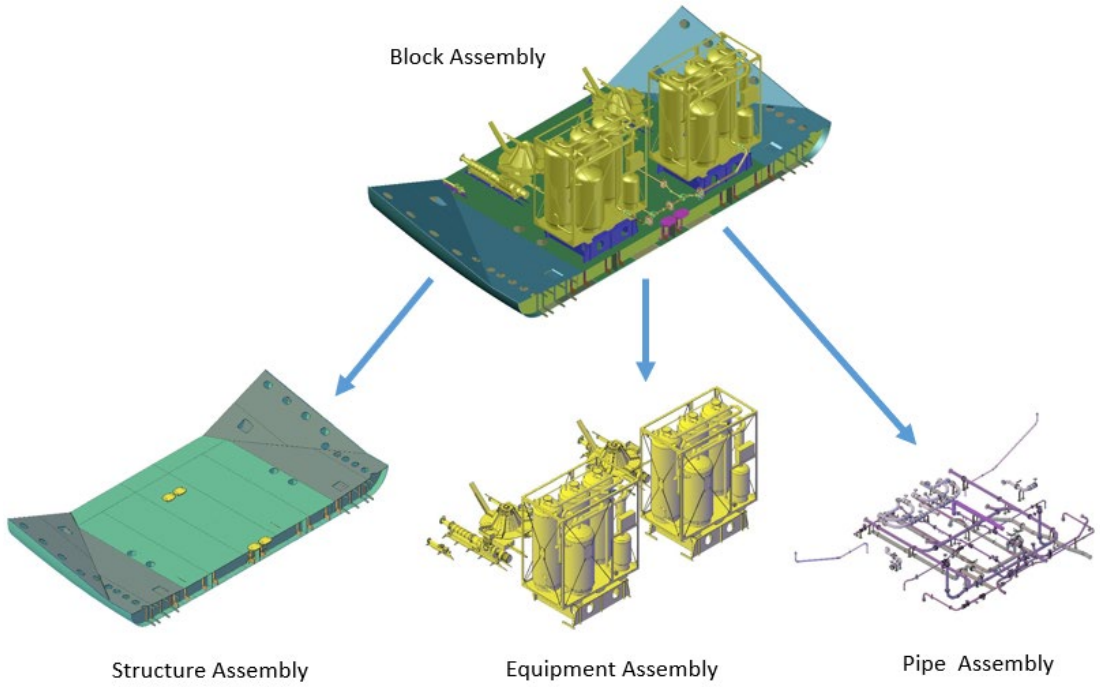
Griffin Day, Planning

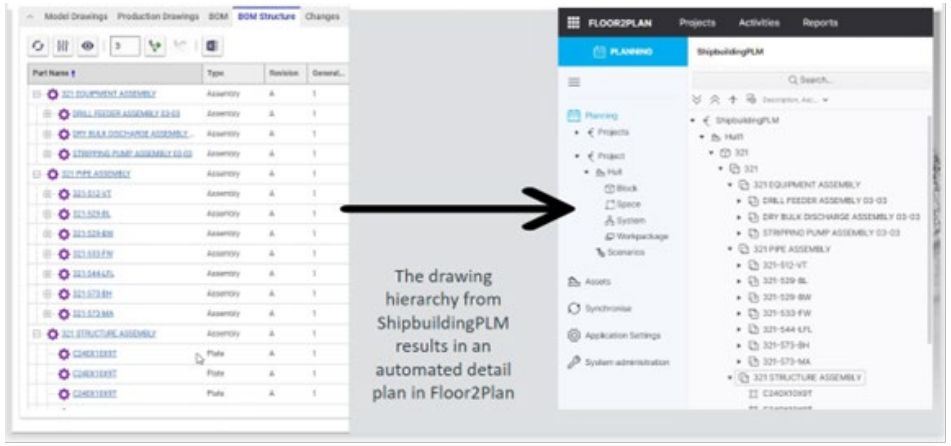
Floorganise

Ronald de Vries, Managing Director

Problem Statement

- Integrate all operational processes and information requirements with available engineering data and shipyard specific value streams to reduce costs and improve schedule adherence.





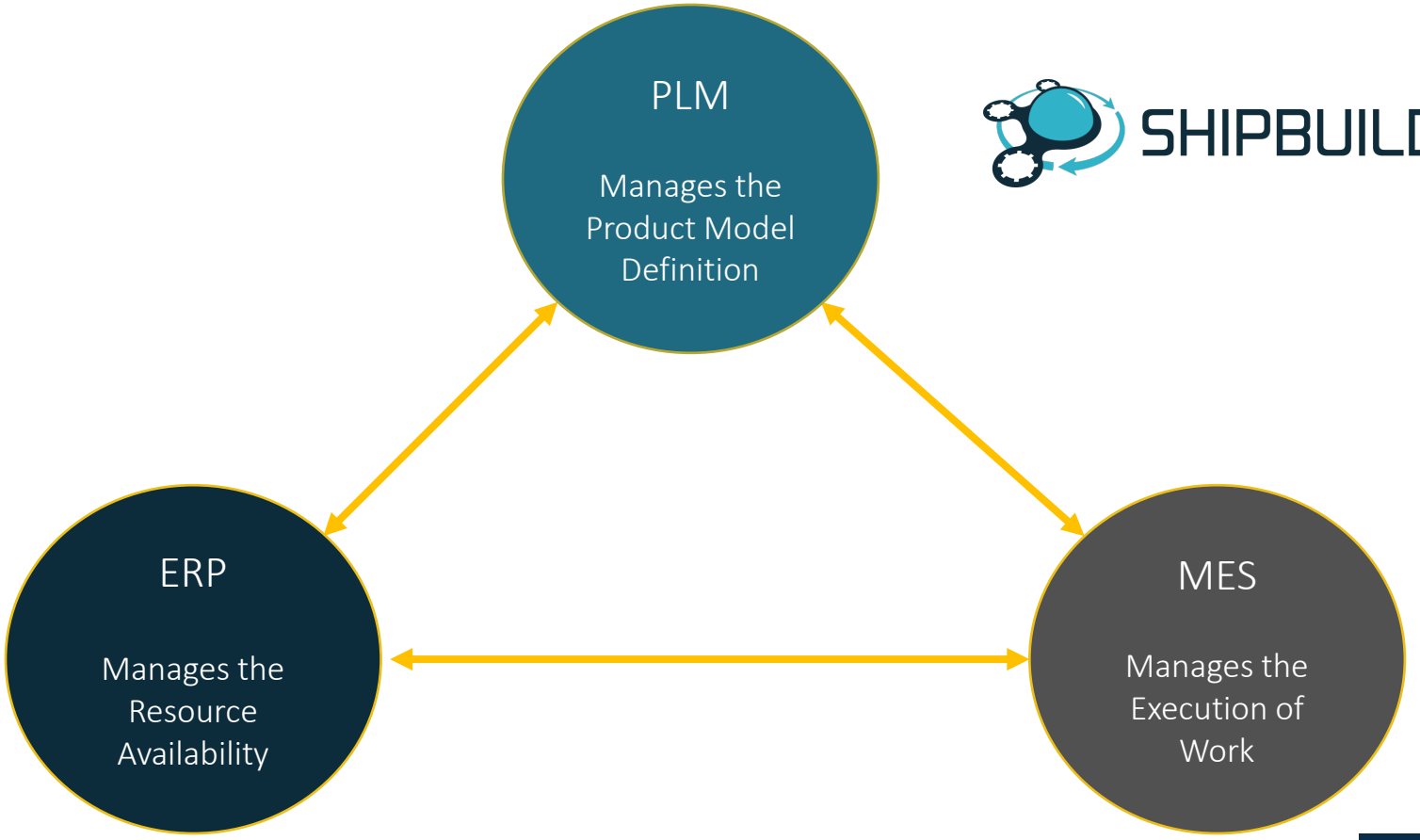
Project Objective

- Stand up a pilot program of Floor2Plan at each participating shipyard to research how to improve the shipyard efficiencies for higher levels of competitiveness (cost-price and lead-time) through digitization in engineering, organizational, and physical shipbuilding processes using an integrated Shipyard Manufacturing Execution System (MES) platform

Platform Roles

- PLM
  - PLM is the configured enterprise source of truth for the product model definition and the origin of the Model Based Enterprise (MBE), Part-Centric Digital Thread: **What will be manufactured, How it will be manufactured and tested**, and **What materials are needed** to manufacture it.
  - **PLM configuration controls the product model definition** through design iteration and change management, communicating the impact of change to downstream stakeholders.
- MES
  - **MES defines the detailed work activities and oversight of the execution of manufacturing work** (human and automated) to create a physical product, based on the configured product model definition.
  - **MES tracks work completion and what resources (materials, time/hours) have been consumed to complete the work.**

PLM/ERP/MES Roles in an integrated shipyard architecture

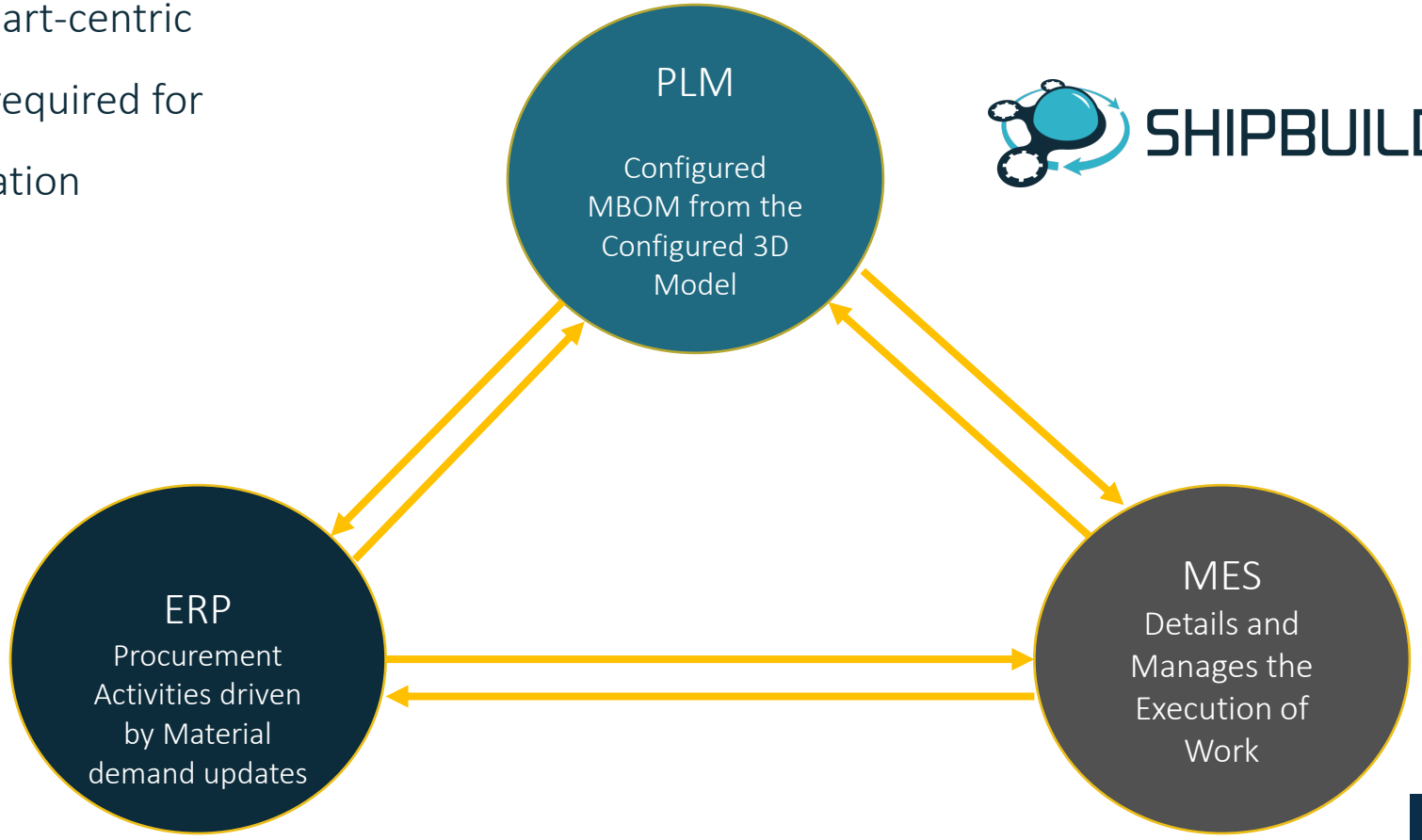


SHIPBUILDINGPLM™

Floor2plan

Model Based MBOM Workflows

- Model-based, part-centric architecture is required for effective integration



SHIPBUILDINGPLM™

Floor2plan

What is Floor2Plan?

Used in RA project

Data exchange

Floor2plan

Time & attendance

Hours on jobs, hrs on site holidays, qualifications, personal shifts

Production planning & scheduling

Make-ready and last planner methods

Shop floor control

Digital work packs, change-, management + workflows + progressing..

Project control

Integral planning / scheduling, scenario planning, QC reporting,

Miscellaneous

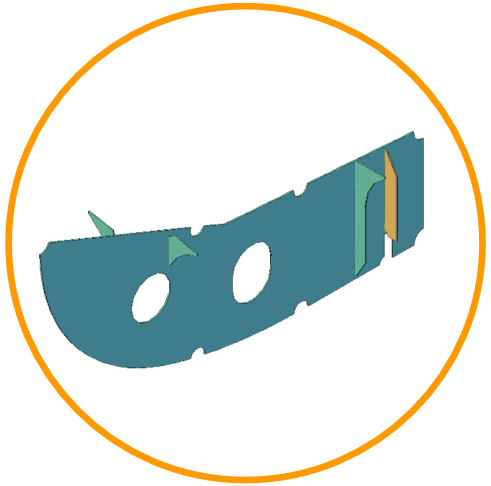
Asset man, EVMS, CPI/SPI, 3D kitting, resource loading

Floorganise

Triggering Smart Shipbuilding

Methodology

ENGINEERING MODEL



We use the metadata from the drawings as input to drive automated templating

+

TEMPLATES

ASSEMBLY

Fabrication

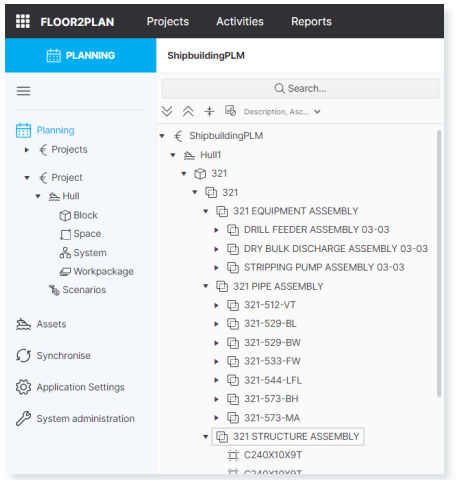
Assembling

Mounting

Floor2Plan then turns the engineering model metadata into a detailed planning

=

DETAIL PLANNING



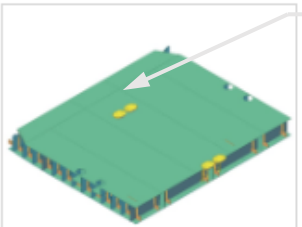
More detail in operations planning fosters more control

FLOOR2PLAN | 1: Shipyard | Demo Admin

FLOORBOARD | temp / N01 | Save

COMPONENT

Co N01



TASKS

Ta Mounting
522 : Welding
0%

Ta Mounting
521 : Grinding
0%

Co N01 (Sub Assembly) 22031

Link to ShipbuildingPLM 3D Model

37081.623

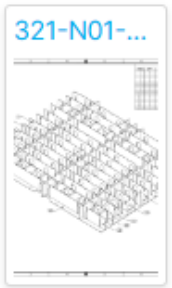
Component T...	Sub Assembly	Assembly	N01
		Block	321
		Workpackage	321 STRUCTURE ASSEMBLY

Related drawings ShipbuildingPLM

Files


321-N01-C...


321-N01-...


321-N01-...

ALL FILES

Product Breakdown

- Stiffener (150)
- Equipment (8)
- Plate (155)
- Assembly (34)

Ac Mounting: 8/16/2024 (33) - 11/27/2024 (48) 419789

Window Start	08/16/2024 (week 33)
Window Finish	11/27/2024 (week 48)
Planning Level	lvl4

PROGRESS

% 0%

Hours Budget	445
Hours Worked	0
Hours To Go	445
Progress	0%

Connect to MES Platforms

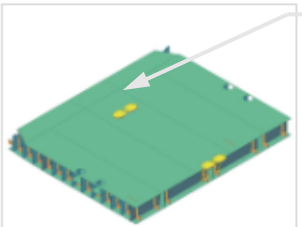
Floorganise
Triggering Smart Shipbuilding

FLOOR2PLAN | 1: Shipyard | Demo Admin

FLOORBOARD | temp / N01 | Save

COMPONENT

Co N01



TASKS

Ta Mounting
522 : Welding
0%

Ta Mounting
521 : Grinding
0%

Co N01 (Sub Assembly) 22031

Link to ShipbuildingPLM 3D Model

37081.623

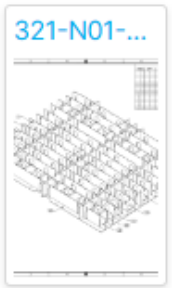
Component T...	Sub Assembly	Assembly	N01
		Block	321
		Workpackage	321 STRUCTURE ASSEMBLY

Related drawings ShipbuildingPLM

Files


321-N01-C...


321-N01-...


321-N01-...

ALL FILES

Product Breakdown

- Stiffener (150)
- Equipment (8)
- Plate (155)
- Assembly (34)

Ac Mounting: 8/16/2024 (33) - 11/27/2024 (48) 419789

Window Start	08/16/2024 (week 33)
Window Finish	11/27/2024 (week 48)
Planning Level	lvl4

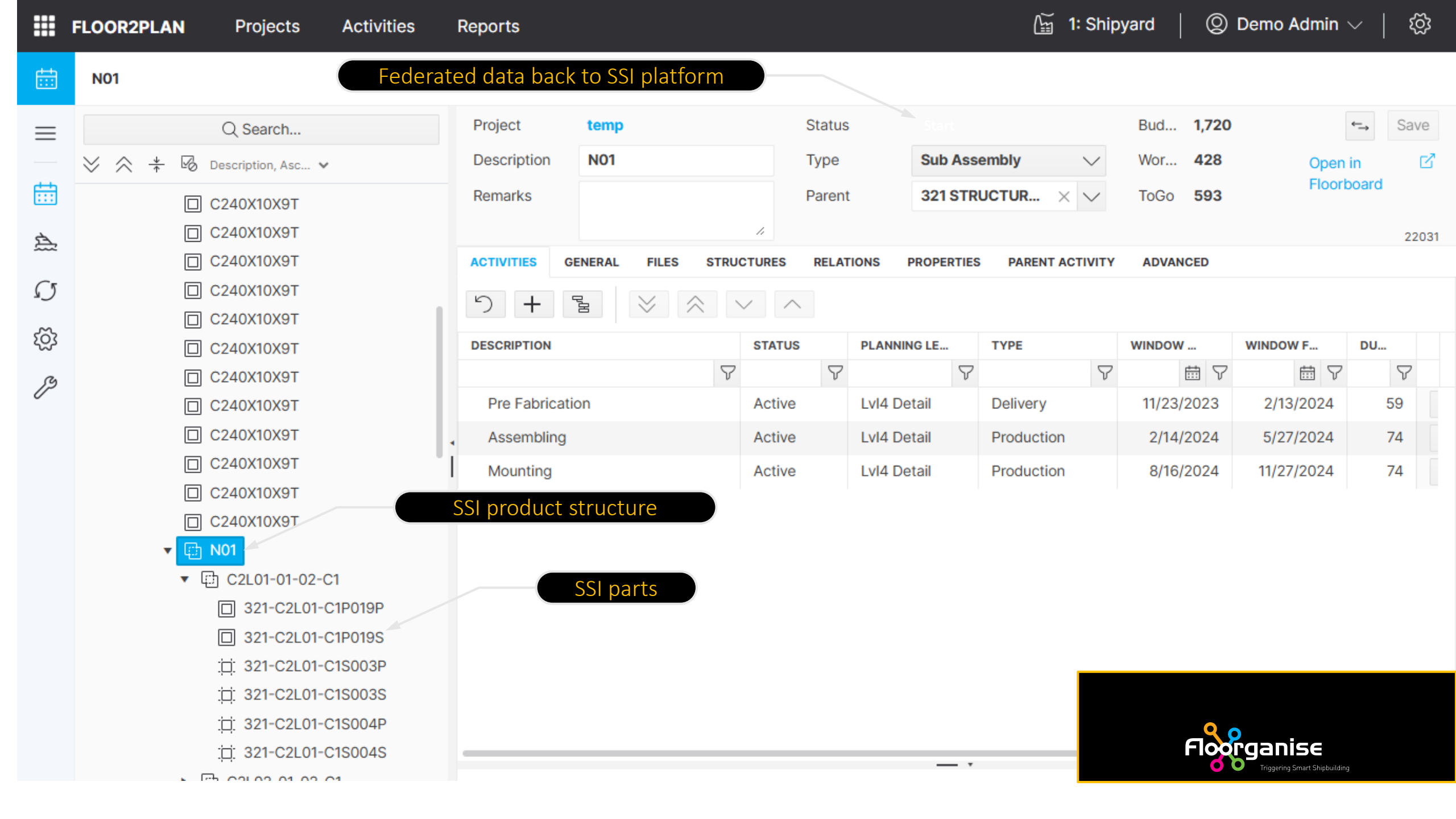
PROGRESS

% 0%

Hours Budget	445
Hours Worked	0
Hours To Go	445
Progress	0%

Connect to MES Platforms

Floorganise
Triggering Smart Shipbuilding


FLOOR2PLAN
Projects
Activities
Reports
1: Shipyard
Demo Admin
N01
Federated data back to SSI platform
Search...
Description, Asc...
C240X10X9T
N01
C2L01-01-02-C1
321-C2L01-C1P019P
321-C2L01-C1P019S
321-C2L01-C1S003P
321-C2L01-C1S003S
321-C2L01-C1S004P
321-C2L01-C1S004S
SSI product structure
SSI parts
Project
temp
Description
N01
Remarks
Status
Type
Sub Assembly
Parent
321 STRUCTUR...
Bud... 1,720
Wor... 428
ToGo 593
Save
Open in Floorboard
22031
ACTIVITIES
GENERAL
FILES
STRUCTURES
RELATIONS
PROPERTIES
PARENT ACTIVITY
ADVANCED
DESCRIPTION
STATUS
PLANNING LE...
TYPE
WINDOW ...
WINDOW F...
DU...
Pre Fabrication
Active
Lvl4 Detail
Delivery
11/23/2023
2/13/2024
59
Assembling
Active
Lvl4 Detail
Production
2/14/2024
5/27/2024
74
Mounting
Active
Lvl4 Detail
Production
8/16/2024
11/27/2024
74
Floorganise
Triggering Smart Shipbuilding

aras INNOVATOR

SHIPBUILDINGPLM

IA

N01

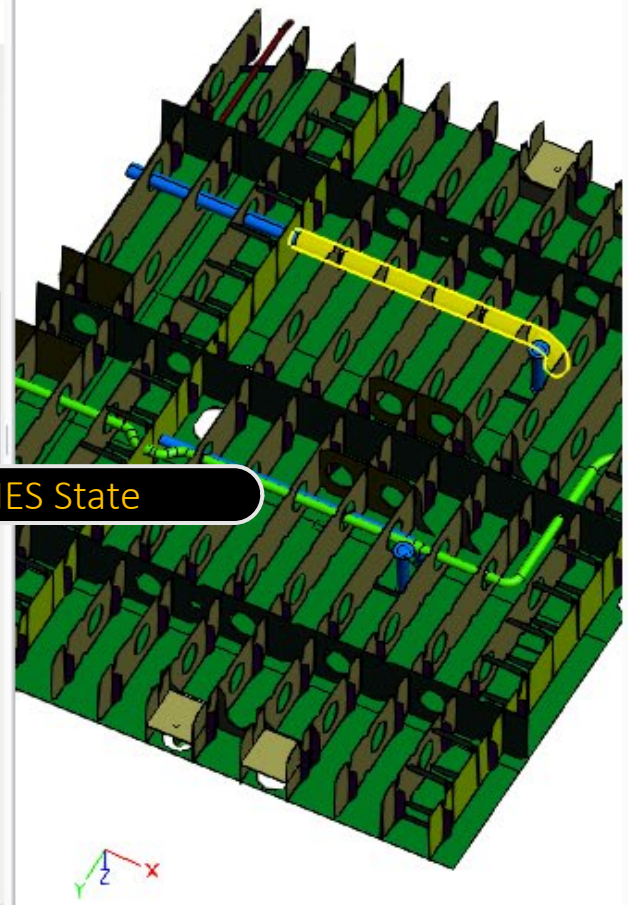
Edit

Model Views

Bill No	MES State
B321N01_004	Start
B321N01_003	Start
B321N01_002	Start
B321N01_001	Start

SSI_View3D_Part2

- C2L02-C1
- Outfit
  - 321-BW-4
  - 321-BW-3
  - 321-BW-2
  - 321-BW-1
  - 321-OutfitP028P
  - 321-OutfitP013S
  - 321-OutfitS011P
  - 321-OutfitS011P
  - 321-OutfitS011S
  - 321-OutfitS040P
  - 321-OutfitS050P
  - 321-OutfitS037S
  - A299



Visualize MES State

Outfit

Edit

BOM | BOM Structure | Production Documentation | Files | Where Used | Changes

Parts

Hidden

Name	Type	Revi...	Gene...	Total Wei...	MES St...	Bill No
321-BW-4	Spool	A	2	36.819	Start	B321N01_004
321-BW-3	Spool	A	2	32.164	Start	B321N01_003
321-BW-2	Spool	A	3	195.921	Start	B321N01_002
321-BW-1	Spool	A	3	117.348	Start	B321N01_001
321-OutfitS011P	Stiffener	A	1	6.407		
				6.407		
321-OutfitS011S	Stiffener	A	1	6.407		
321-OutfitS040P	Stiffener	A	1	0.838		
321-OutfitS050P	Stiffener	A	1	0.819		
321-OutfitS037S	Stiffener	A	1	0.807		
321-BL-1	Spool	A	1	90.142		
321-BW-5	Spool	A	1	22.268		
321-BL-3	Spool					

Visualize MES State

Prev Next Page: 1 of 1

Connect to MES Platforms

Floorganise

Triggering Smart Shipbuilding

Phase 1 Overview

- SSI and Floorganise conducted value stream mapping of information at each of the participating shipyards
- Captured business processes and data requirements of each participant
- Targeted groups at the shipyards included: Engineering, Production, IT, Planning and Project Control Processes

- Floorganise and SSI defined the data available to export from ShipbuildingPLM™ to the Floor2Plan Tool

- Floorganise and SSI held a workshop for project team members to demonstrate the workflow using SSI commercial ship data

Project Status

- Phase 1 activities completed
- Phase 2 in work
- Phase 2 plans:
  - Standing up pilot environments at HII and FMM
  - Requesting a 60 day no-cost extension due to delays in getting Phase 2 approval and setting up shipyard environments
  - Execute pilot program at each shipyard with ship data of their choice
  - Report findings of pilot programs at an industry workshop
    - May 13 – 15, 2025 SSI Offices, Mobile Alabama
  - Prepare and submit the final report

Project Benefits

- Understand relationships within operational processes prior to completion of the engineering model
- Use need by dates and actuals from production to determine priorities for the engineering team
- Automation of manual planning processes
- Direct progressing to support better project control

>15% overall hour savings per project

35% reduction in planning hours

Questions?

NSRP
NATIONAL SHIPBUILDING RESEARCH PROGRAM™
Taking Shipbuilding and Repair to the Next Level